UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,346	09/24/2003	Mohammad Jaber Borran	088245-0108	7074

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EXAMINER
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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/671,346	BORRAN ET AL.
	Examiner	Art Unit	
	Kevin M. Burd	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *15 February 2010*.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *41,42,45,47-50,53-58 and 61-81* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *41,42,45,47-50,53-58 and 61-81* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some *   c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

1.   This office action, in response to the amendment filed 2/15/2010, is a final office

action.

Response to Arguments

2.   Applicant's arguments with respect to the pending claims have been considered

but are moot in view of the new grounds of rejection necessitated by the amendment to

the claims.

3.   Applicant states the previously cited prior art does not disclose the plurality of

stored signal constellations is stored as at least one of a look-up table or an algorithm

as recited in claims 76-78. The examiner disagrees. As stated in the previous office

action, Olafsson discloses a communication system where optimized signal point

constellations are derived and a constellation is selected from a group of predetermined

constellations (column 10, lines 13). Any number of constellations can be stored

(column 10, lines 18-20). Particular signal point constellations are stored in database

510 for subsequent use during encoding (column 10, lines 37-40) so the modem system

need not individually determine new signal point constellations for each transmit session

(column 10, lines 25-27). Each of the constellations are already determined and stored

in the memory. The constellations are optimized in accordance with any number of

factors including any other known sources of digital impairments (column 10, lines 17-

24). The constellations are stored in a memory and are available to be extracted from

that memory when necessary. The recovering of the data from the memory will follow a

corresponding algorithm to extract that data. In addition, the memory itself is a look-up

table. The data is stored in memory addresses. A data input indicating the data to be

extracted is input to the system and the correct data will be output.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 41, 42, 45, 47-50, 53-58 and 76-81 are rejected under 35 U.S.C. 103(a)

as being unpatentable over Narasimhan (US 7,505,788) in view of Dabak et al "Signal

Constellations for Non-Gaussian Communication Problems" Statistical Signal and Array

Processing. Minneapolis, April 27-30 1993. Proceedings of the International Conference

on Acoustics, Speech, and Signal Processing (ICASSP), New York, IEEE, US, VOL. 4,

pages 33-36 further in view of Olafsson (US 6,023,493).

Regarding claims 41, 49, 54-57 and 76-78, Narasimhan discloses a method of

transmitting a signal utilizing the communication system shown in figure 1. The

transmitter 150 or receiver 115 includes an antenna selection module 150. The antenna

selection module selects a subset of antennas at the transmitter and receiver as shown

in figure 2 (column 3, lines 6-10). The antenna selection operation may select an

optimum number of transmit antennas and corresponding symbol constellations using

channel correlation matrices (column 3, lines 14-16). Once the optimum number of

antennas is selected (column 4, lines 34-35), the constellation for transmission is then

selected (column 4, lines 40-41). Some types of constellations are disclosed in column

4, lines 40-49. Data will be input to the communication system, converted to symbols to

be transmitted according to the selected transmit constellation, modulated on a carrier

wave and transmitted to the receiver (figure 1). The antenna selection module 150 at

the receiver may determine the number of transmit antennas and transmit the results to

the transmitter (column 4, lines 50-56). Narasimhan does not disclose the method

selected signal constellation includes a plurality of constellation points selected by

maximizing a minimum Kullback-Leiber distance. However, Dabak discloses a method

of computing optimum signal sets (abstract). By optimizing the constellation points for

non-Gaussian communication problems, the problems can be overcome and proper

communication between users can be achieved. This optimization is achieved since the

Kullback information can be used to express how performance varies with noise

amplitude distribution and with signal set choice (III). Additional information regarding

the Kullback information is provided in heading II. It would have been obvious for one of

ordinary skill in the art at the time of the invention to provide this simple substitution of

the constellations of Dabak for the constellations of Narasimhan since the constellations

will operate in substantially the same manner and will yield predictable results In

addition, the combination will achieve the results stated above in Dabak. The

combination does not expressly disclose storing all of the available constellations. The

combination will determine the appropriate number of transmit antennas to be used and

select an appropriate constellation for the antennas (Narasimhan: figure 2). Storing data

in a storage medium so computations are minimized during the operation of a device is well known in the art of communication. Olafsson discloses a communication system where optimized signal point constellations are derived and a constellation is selected from a group of predetermined constellations (column 10, lines 13). Any number of constellations can be stored (column 10, lines 18-20). Particular signal point constellations are stored in database 510 for subsequent use during encoding (column 10, lines 37-40) so the modem system need not individually determine new signal point constellations for each transmit session (column 10, lines 25-27). Each of the constellations are already determined and stored in the memory. The constellations are optimized in accordance with any number of factors including any other known sources of digital impairments (column 10, lines 17-24). It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teaching of Olafsson into the combination of Narasimhan and Dabak to provide this simple substitution of the determining and selecting of the signal constellation with the selecting and accessing of the signal constellation of Olafsson since the circuit will operate in substantially the same manner and will yield predictable result. In addition, the combination will have the added benefit of reducing computations when the system is active since the modem system need not individually determine new signal point constellations for each transmit session.

Regarding claims 42, 45, 47, 48, 50, 53, 58 and 79-81, Narasimhan discloses the antenna selection and corresponding symbol constellation selection uses channel correlation matrices (column 3, lines 14-16). The criterion used for selection of antennas

may be maximization of the minimum SNR margin. A post processing SNR refers to the

SNR derived after data from multiple antennas are combined in the receiver (column 3,

lines 35-46). In addition, the antenna selection module 150 at the receiver may

determine the number of transmit antennas and transmit the results to the transmitter

(column 4, lines 50-56).

5.   Claims 61-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Narasimhan (US 7,505,788) in view of Dabak et al "Signal Constellations for Non-

Gaussian Communication problems" Statistical Signal and Array Processing.

Minneapolis, April 27-30 1993. Proceedings of the International Conference on

Acoustics, Speech, and signal Processing (ICASSP), New York, IEEE, US, VOL. 4,

pages 33-36, further in view of Won (US 7,269,436) further in view of Olafsson (US

6,023,493) further in view of De Gaudenzi et al (US 2006/0209982).

        Regarding claims 61-75, the combination of Narasimhan, Dabak and Olafsson is

disclosed above. The combination does not disclose the selected signal constellation

comprises sub-constellations wherein the sub-constellations comprise a plurality a

plurality of points located on a surface of a plurality of concentric spheres. However,

Claim 1 of De Gaudenzi recites mapping the modulation symbols where the signal

constellation comprising a number of digital signal points equally spaced on at least two

concentric rings having respective predetermined radii, where the ratio of the radii of the

concentric rings is chosen so as to maximize the minimum geometrical distance

between pairs of points of the digital signal constellation. It would have been obvious for

one of ordinary skill in the art at the time of the invention to provide the simple

substitution of the constellation format of De Gaudenzi into the constellations of the

combination of Narasimhan, Dabak and Olafsson since the transmit constellations will

operate in substantially the same manner and will yield predictable results. Dabak

discusses the Kullback information.

Conclusion

Applicant's amendment necessitated the new grounds of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-

3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M. Burd/
Primary Examiner, Art Unit 2611
5/27/2010